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Other: ONLINE: WPI, EPODOC, PAJ

(54) Abstract Title
Air exhaust structure for an upright-type vacuum cleaner

(57) An air exhaust structure for an upright-type vacuum cleaner is disclosed, the exhaust structure including a frame 32, having an internal duct 31, formed in a side wall of a vacuum cleaner body, the duct allowing air to be exhausted from a motor driving chamber. The structure also includes a support member 33 protruding from an inner wall of the duct 31, a filter 34, and a filter cover 35, having a grille portion 35, attached to the frame 32 by a hinge. The filter cover 35 is configured to be opened and closed. A removing means 40 is provided for securing the filter cover 35 in the closed position, and for allowing the filter cover to be moved to the open position. The removing means 40 includes a hook 50 formed at a front end of the filter cover 35 and a locking hole 60 is provided on the frame 32 for receiving part of the hook so that it engages a locking protrusion 60a formed in the locking hole. The hook 50 includes a fixing portion 51 connected to the filter cover and a flexible pressing portion 52 bent backwards in a direction substantially inverted from the fixing portion. A pair of protrusions 53 are disposed at sides of the flexible pressing portion 52 and are arranged to engage with the locking protrusion 60a in the locking hole 60.

FIG.5

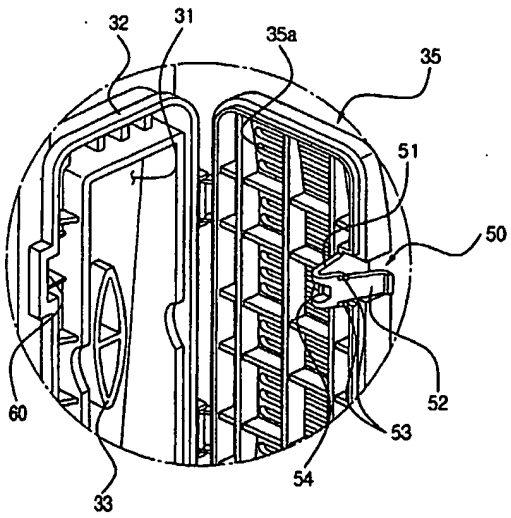

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FIG. 1

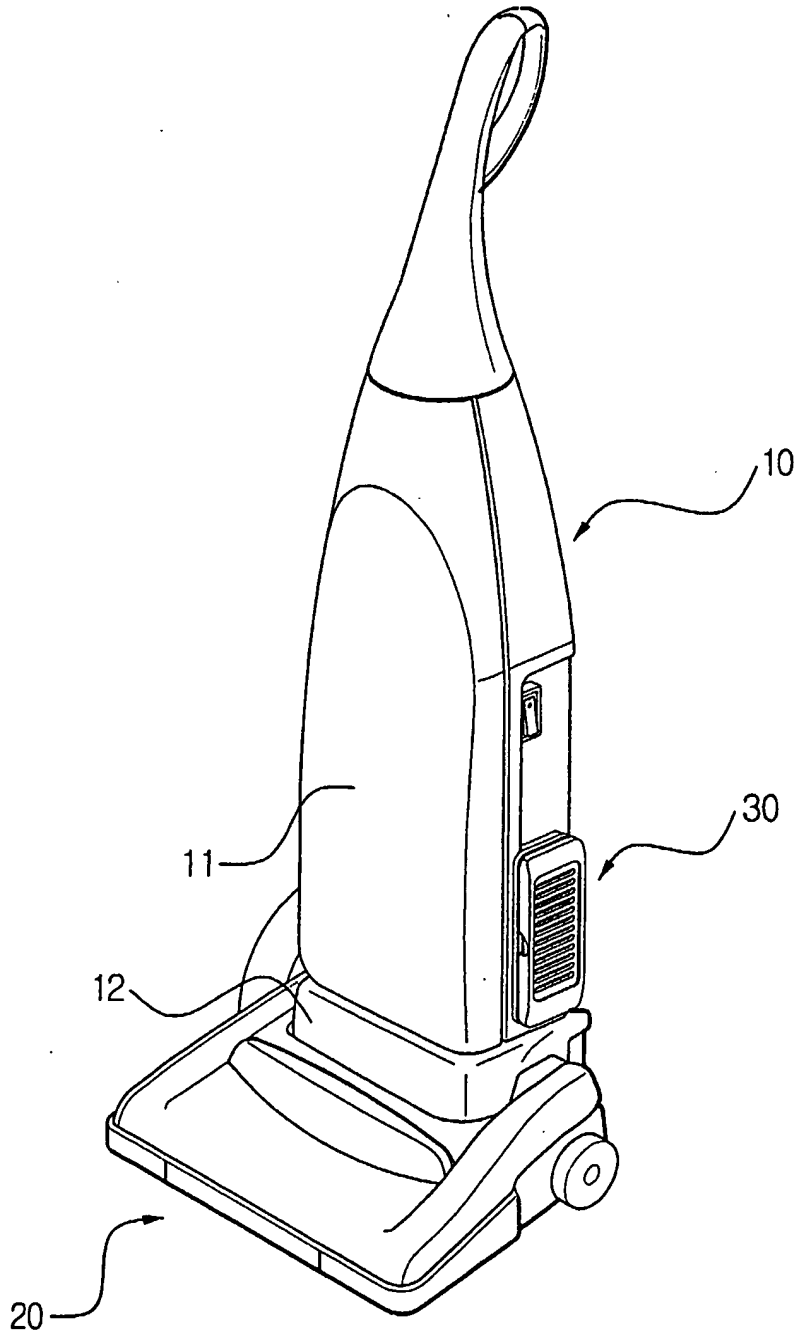


FIG.2

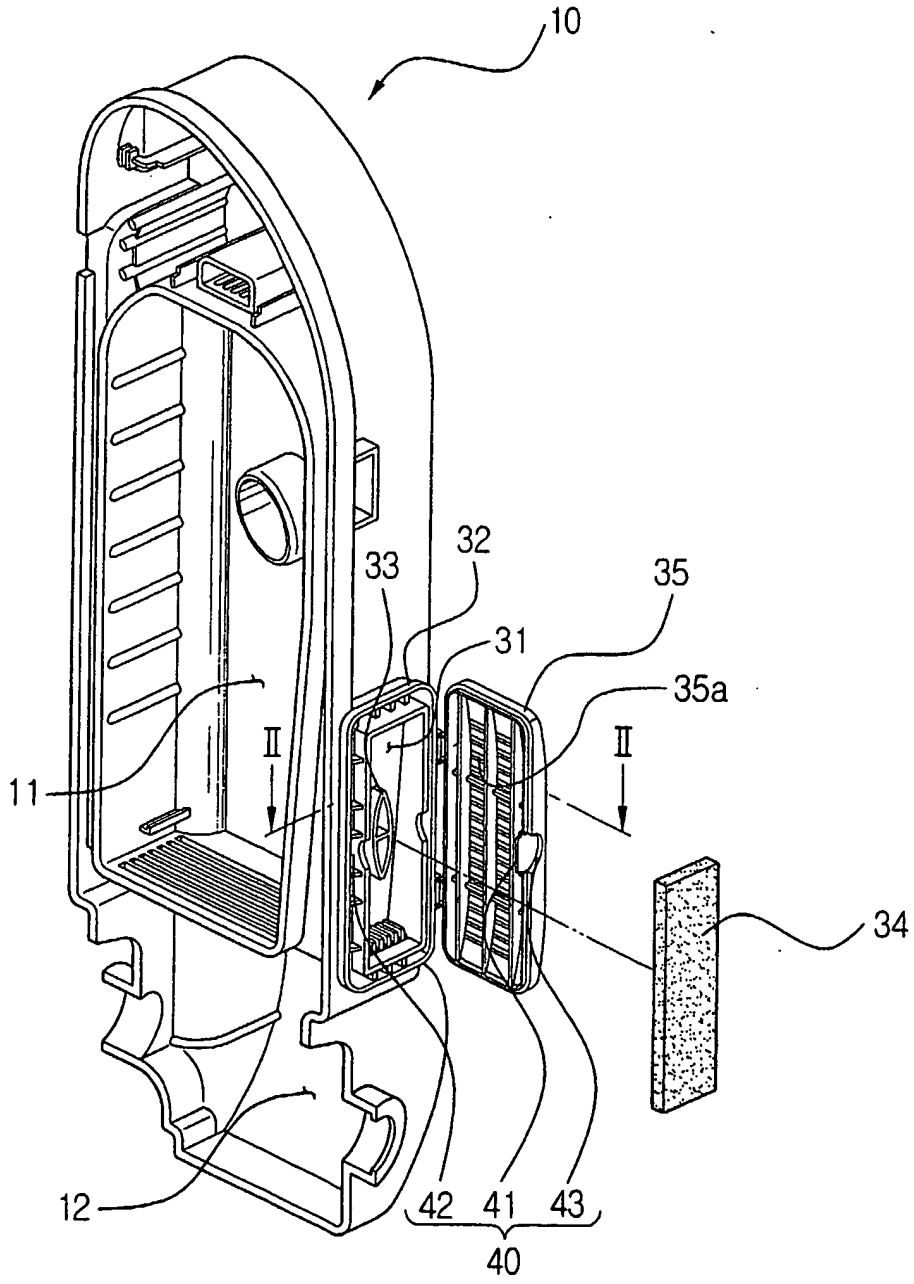


FIG.3

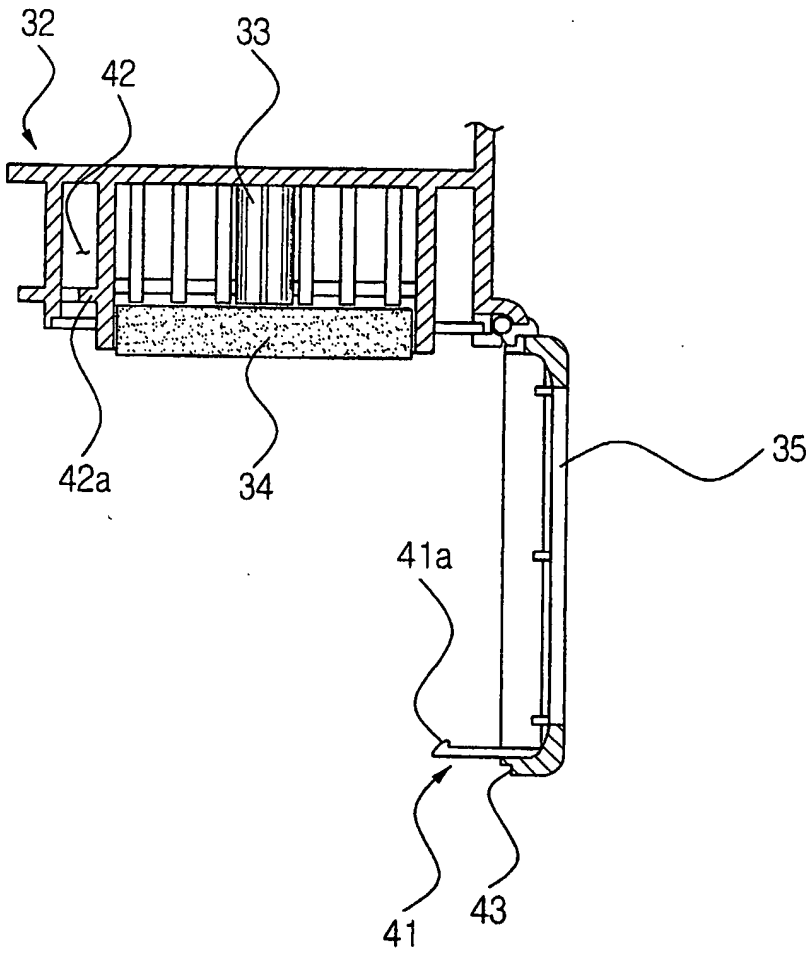


FIG.4

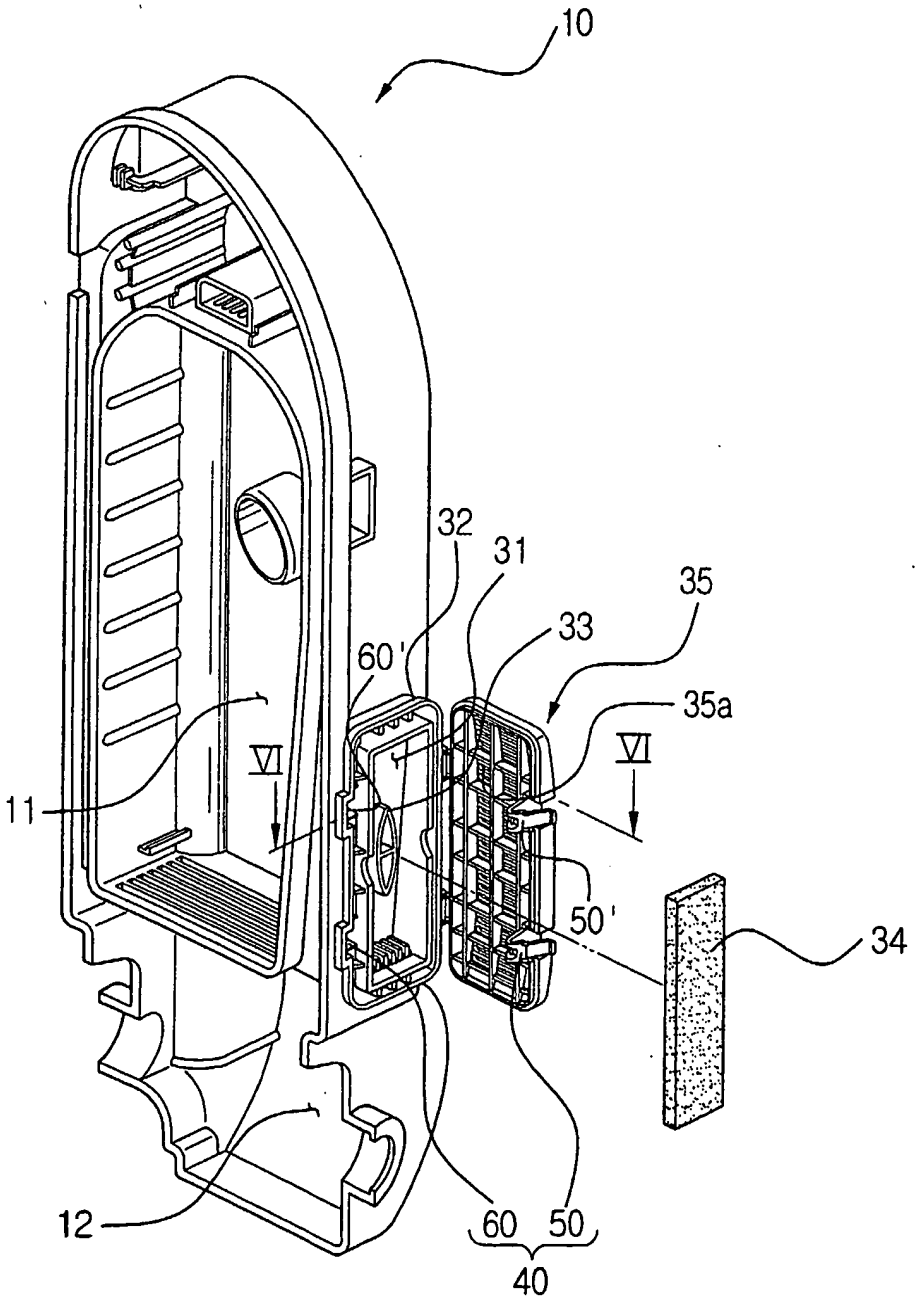


FIG.5

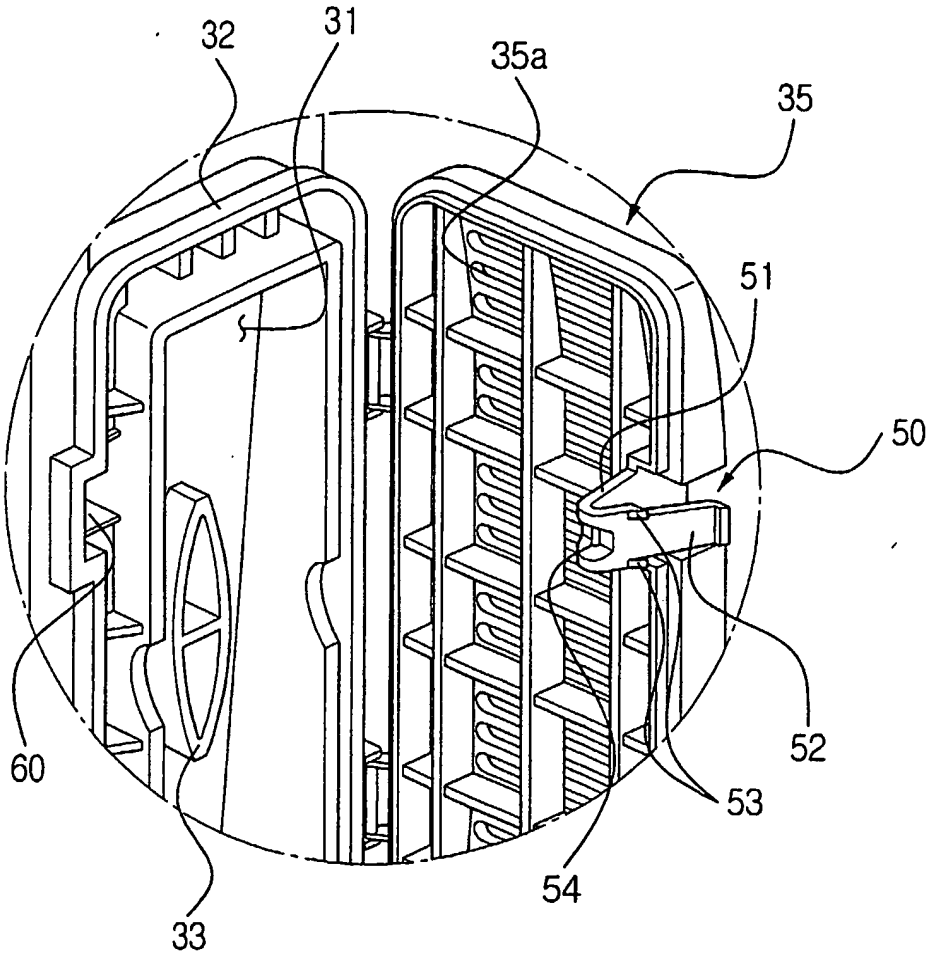
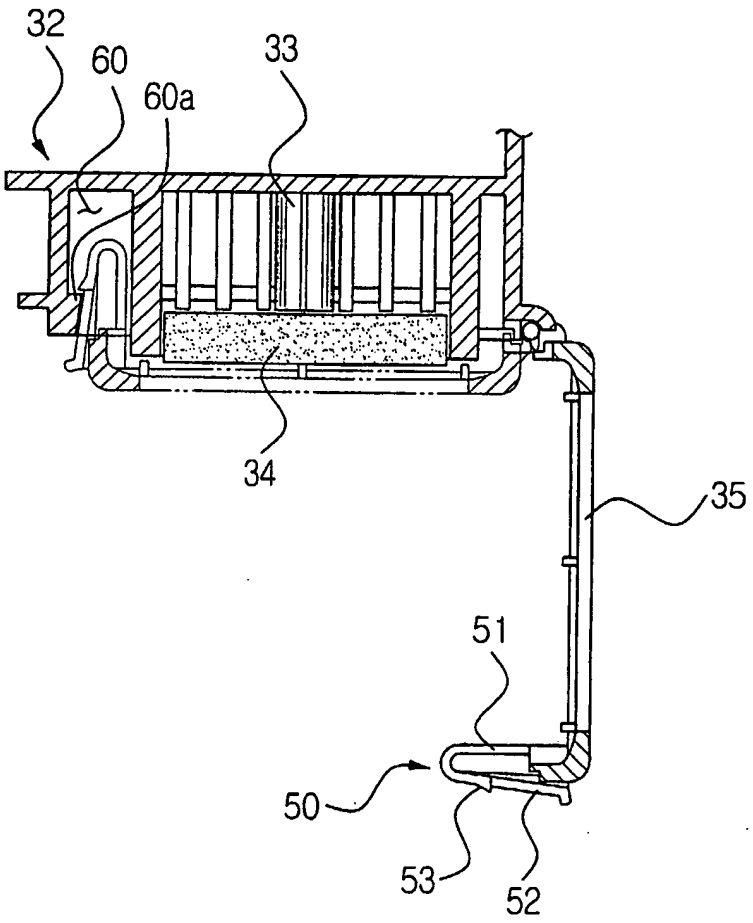


FIG.6



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AIR EXHAUST STRUCTURE FOR AN UPRIGHT-TYPE VACUUM CLEANER

The present invention relates generally to a vacuum cleaner, and more particularly, to an air exhaust structure for an upright-type vacuum cleaner.

As shown in Figure 1, a conventional upright-type vacuum cleaner comprises a suction brush 20 connected to a lower part of a cleaner body 10. In use, the suction brush 20 is moved over a surface to be cleaned. The cleaner body 10 comprises a dust-collection chamber 11 disposed at an upper part thereof, and a motor driving chamber 12 disposed at a lower part thereof. A dust filter (not shown) is removably disposed in the dust-collection chamber 11, and a motor (not shown) is disposed in the motor driving chamber 12.

In this conventional upright-type vacuum cleaner, when the motor is operated, a strong suction force is generated at the suction brush 20. Air, including entrained dust and dirt (contaminants) present on the surface to be cleaned, are drawn into the cleaner body 10 through the suction brush 20. The drawn air passes into the motor driving chamber 12 after passing through the dust filter in the dust-collection chamber 11. At this time, dust and dirt entrained in the air is collected by the dust filter. The air is discharged through the motor driving chamber 12.

The discharged air should be clean (i.e. it should be free of the dust and dirt) and should be easily discharged. For this purpose, the upright-type vacuum cleaner has an air exhaust structure 30.

An example air exhaust structure for an upright-type vacuum cleaner is shown in Figures 2 and 3. The exhaust structure shown in these Figures comprises: a frame 32, defining a duct 31 arranged at one side of the cleaner body 10 in a generally lengthwise direction and arranged to communicate with the motor driving chamber 12; a support member 33 protruding from an inner wall of the duct 31; a filter 34 situated in the duct 31; a filter cover 35 having a grille portion 35a hinged to the frame 32, the cover being

rotated to open and close the duct 31; and release means 40 for opening and closing the filter cover 35.

The opening and closing release means 40 is integrally formed, approximately at the centre of the front end of the filter cover 35. This opening and closing means 40 includes a hook 41, represented in plan view in Figure 3, having a protrusion 41a at a free end thereof, a locking hole 42 having a locking protrusion 42a formed on the frame 32, the protrusion being placed at a position so as to engage the hook 41, and an opening handle 43 disposed in the region of the hook on the filter cover 35.

Air discharged from the motor driving chamber 12 is drawn into the duct 31 and the air is then discharged out of the duct through the filter 34 and the grille portion 35a of the filter cover 35. At this time. dust and dirt entrained in the air is captured by the filter 34. When the cleaner is used over a long period, dust and dirt captured in the filter 34 will cause clogging of the filter. Thus, air may not be smoothly and efficiently discharged. Therefore, the filter 34 needs to be periodically removed for cleaning or changing. When the filter 34 is cleaned or changed, a user pulls the opening handle 43 of the filter cover 35. Then. the protrusion 41a of the hook 41 becomes released from the locking protrusion 42a in the locking hole 42, and the filter cover 35 is thus opened. The filter 34 is removed from the duct 31 and a new filter can be inserted. After the filter 34 is changed. the filter cover 35 is closed, the protrusion 41a of the hook 41 being locked with the locking protrusion 42a of the locking hole 42, and the filter cover 35 being so retained in the closed position.

However, with the exhaust structure of the above-described type, since the protrusion part 41a of the hook 41 retains the closed state of the filter cover 35 by being forcibly connected with the locking protrusion 42a in the locking hole 42, great force is required for the filter cover 35 to be opened and closed. Thus, opening and closing the filter cover 35 can be difficult. In other words, when the filter cover 35 is opened, the protrusion 41a of the hook 41 has to be released from the locking protrusion 42a and so the filter cover 35 can only be opened when a sufficient force, i.e. strong enough to overcome the resistance of these combined elements, is applied. In addition, when the

filter cover 35 is closed, the protrusion 41a of the hook 41 can only be locked with the locking protrusion 42a when a sufficient force, strong enough to overcome the resistance of these combined elements, is applied. Accordingly, opening and closing of the filter cover 35 is difficult.

Furthermore, when the above-described filter cover 35 is opened and closed, it is possible for the protrusion 41a of the hook 41 and the locking protrusion 42a of the locking hole 42 to be broken as a strong force is applied to the hook 41. Moreover, the connection of the hook protrusion 41a and the locking protrusion 42a may become weakened due to repeated abrasion between the elements. Thus, there exists a problem in that the filter cover 35 can inadvertently become opened by the pressure of air being discharged as the user operates the vacuum cleaner.

An aim of the present invention is to provide an air exhaust structure for an upright-type vacuum cleaner capable of improved operation, and offering convenience for a user. In a preferred embodiment, this is achieved by providing a filter cover which is not easily opened by the pressure of discharging air, whilst. at the same time, the filter cover is able to be easily opened and closed by the user.

According to one aspect of the invention, there is provided an air exhaust structure for an upright-type vacuum cleaner having a cleaner body, comprising: a frame having a duct arranged in a side wall of the cleaner body in order to communicate with a motor driving chamber of the cleaner body; a support member protruding from an inner wall of the duct: a filter; a filter cover having a grille portion disposed on the frame; and at least one removing means for enabling opening and closing of the filter cover, wherein the removing means includes at least one hook formed at a front end of the filter cover, and a locking hole having a locking protrusion disposed on the frame and arranged at a position corresponding to the position of the hook thereby to engage the at least one hook. and to maintain the filter cover in a closed state.

According to a second aspect of the invention, there is provided an air exhaust structure for connection to an upright type vacuum cleaner. comprising: a frame, connectable to a

wall of the vacuum cleaner, and defining an internal duct through which air can be discharged from the vacuum cleaner; a frame cover for covering the duct and having one or more holes formed therein, the frame cover being hinged to the frame at a first edge so as to be moveable between an open position and a covered position, and a securing mechanism operable to retain the frame cover in the covered position by means of a resilient member biased so as to engage a catch, the mechanism being operable to release the resilient member from the catch by means of an external release member arranged to case movement of the resilient member against its biasing.

There may thus be provided an air exhaust structure for an upright-type vacuum cleaner comprising: a frame having a duct formed at a side of the cleaner body, preferably in a lengthwise direction, in order to communicate with the motor driving chamber; a support member protruding from an inside wall of the duct; a filter; a filter cover having a grille portion disposed on the frame; and a removing means for opening and closing the filter cover. The removing means may include a hook formed at a front end of the filter cover, and a locking hole having a locking protrusion disposed in the frame at a position corresponding to the position of the hook. In addition, the hook can include a fixing portion extending from the filter cover, a flexible pressing portion bent in a direction approximately 180° from the fixing portion, and a pair of protrusions disposed at sides of the flexible pressing portion and connectable with the locking protrusion of the locking hole.

In a preferred embodiment of the invention, at least one hook is disposed at a front end, or edge, of the filter cover, although a plurality of hooks can be provided, separated by a predetermined distance or interval.

Moreover, a cutaway portion can be formed in the hook fixing portion and a bent portion of the hook flexible pressing portion, in order to increase the elasticity or flexibility of the flexible pressing portion.

Accordingly, the filter cover can be maintained in a closed position since the protrusion of the hook flexible pressing portion is able to flexibly engage the locking protrusion of

the locking hole disposed in the frame. Thus, the filter cover is not opened by the pressure of discharging air. In addition, opening and the closing of the filter cover is easily performed, as the filter cover is opened by releasing the engagement between the protrusion of the flexible pressing portion and the locking protrusion of the locking hole. This requires only a simple pressing operation, i.e. using the flexible pressing portion of the hook.

According to a third aspect of the invention, there is provided an upright-type vacuum cleaner having a cleaner body with a side exhaust port for exhausting air from a fan chamber inside the cleaner body, the exhaust port being defined by a perimeter wall which encircles an exhaust passage and including a hinged external grille covering the passage and a filter element associated with the grille, wherein the grille is retained in its closed position in which it covers the passage by a releasable catch assembly comprising a folded leaf spring having a root portion, a fold portion, and a fastening portion connected to the root portion by the fold portion and which is generally coextensive with the root portion, the root portion being joined to the grille or to the cleaner body in the region of the perimeter wall and extending from the joint inwardly with respect to the cleaner body, and the fastening portion having a distal release tab exposed on the exterior of the cleaner body when the grille is in its closed position.

The invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a conventional upright-type vacuum cleaner;

Figure 2 is a perspective view of part of the vacuum cleaner shown in Figure 2, the Figure showing an air exhaust structure;

Figure 3 is a cross-sectional view taken approximately along the line II-II shown in Figure 2;

Figure 4 is a perspective view of part of a vacuum cleaner having an air exhaust structure according to a preferred embodiment of the present invention;

Figure 5 is a detailed view of part of the exhaust structure shown in Figure 4; and

Figure 6 is a cross-sectional view taken approximately along the line VI-VI shown in Figure 4.

In the following description of a preferred embodiment, features and elements having the same structure or function as elements shown and described in relation to the conventional vacuum cleaner. described previously, are denoted using the same reference numerals.

As shown in Figures 4 to 6. an air exhaust structure for an upright-type vacuum cleaner comprises: a frame 32 having a duct 31, the frame and duct being arranged on a lateral side of the cleaner body 10 in a generally lengthwise direction, the duct 31 being arranged to communicate with the motor driving chamber 12; a support member 33 protruding outwardly from an inside wall of the duct 31 by a predetermined dimension; a filter 34 for insertion into the duct 31; a filter cover 35, having a grille portion 35a, hingedly disposed on the frame 32 to allow the frame 32 to be opened and closed by means of pivotal rotation of the filter cover; and a removing means 40 for allowing opening and closing of the filter cover 35.

The removing means 40 includes a hook 50, which in this case is substantially V-shaped. integrally formed at a front end or edge of the filter cover 35, and a locking hole 60. having at least one locking protrusion 60a, disposed on the frame 32 at a position generally corresponding to the position of the hook 50 when the filter cover 35

is in a closed position. Accordingly, part of the hook 50 may be retained behind the locking protrusion 60a.

As shown in Figure 5, the hook 50 comprises: a fixing portion 51 extending inwardly from the filter cover 35; a flexible pressing portion 52 which is bent backwards in a direction approximately 180° from the fixing portion 51 (i.e. it is substantially inverted) and extending outwardly from the front edge of the filter cover 35; and a pair of protrusions 53 disposed on both sides of the flexible pressing portion 52. The protrusions 53, in use, provide a retaining connection with the locking protrusion 60a of the locking hole 60 (see Figure 6).

The flexible pressing portion 52 is flexibly biased towards an opening direction such that the free end opens outwards in relation to the fixing portion 51. Thus, when in a closed position, the filter cover 35 is inhibited from opening, e.g. due to the pressure of discharging air when a user is operating the vacuum cleaner, since a protrusion 53 of the hook 50, and the locking protrusion 60a of the locking hole 60, are firmly engaged, even when the pressure of the discharging air affects the closed filter cover 35. In other words, the filter cover 35 is firmly held in the closed position when the hook 50 is inserted into the locking hole 60 of the frame 32, and the protrusion 53 of the hook 50 is locked with the locking protrusion 60a of the locking hole 60.

To open the filter cover 35, the user presses the flexible pressing portion 52 of the hook 50, and the protrusion 53 of the hook 50 is released from engagement with the locking protrusion 60a of the locking hole 60. Thus, the filter cover 35 is easily opened.

A cutaway portion 54 can be formed in the bent portion of the hook fixing portion 51 and flexible pressing portion 52, in order to increase the elasticity of the flexible pressing portion 52 with respect to the fixing portion 51. Moreover, in this preferred

embodiment, the exhaust structure has been described and illustrated having two hooks 50 and 50' and two locking holes 60 and 60'. However, it is possible for only one hook and one locking hole to be used, as shown in Figure 5.

In the exhaust structure having the above features and elements, air discharged to the motor driving chamber 12 is blown into the duct 31, and the air is then discharged out of the unit through the filter 34 and the grille portion 35a of the filter cover 35. At this time, dust and dirt entrained in the air is filtered by the filter 34. When the filter cover 35 is opened away from the frame 32 (e.g. for cleaning or changing the filter 34 after the vacuum cleaner has been used for a long time) the user simply presses the flexible pressing portion 52 of the hook 50 disposed on the filter cover 35. At this time, the protrusion 53 on the flexible pressing portion 52 is flexibly engaged with the locking protrusions 60a in the locking hole 60 of the frame 32, when the filter cover 35 is closed. Thus. the filter cover 35 cannot become easily opened and the filter cover 35 is not affected by the discharging air pressure.

When the flexible pressing portion 52 is pressed (when the filter cover 35 is closed) the filter cover 35 can be easily opened as the protrusion 53 of the hook 50 is released from its flexible engagement with the locking protrusion 60a of the locking hole 60. In other words. great force is not required to pull the filter cover 35, in order to open the filter cover 35. unlike the conventional structure employed on an upright vacuum cleaner.

As described, when the user pushes the filter cover 35 closed (e.g. after cleaning and/or changing the filter 34 whilst the cover is open) the closed state of the filter cover 35 is maintained. since the filter cover hook 50 is inserted into the locking hole 60 of the frame 32 and the protrusion 53 of the hook 50 is flexibly locked with the locking protrusion 60a of the locking hole 60.

In the above-described embodiment, the filter cover 35 is maintained closed since the protrusion 53 of the flexible pressing portion 52, disposed on the hook 50, is flexibly connected to, and in engagement with, the locking protrusion 60a of the locking hole 60 disposed on the frame. Thus, the filter cover 35 is not easily opened by the pressure of discharging air. In addition, opening and the closing of the filter cover 35 is easily achieved. The filter cover 35 is opened by releasing the locking state of the protrusion 53 on the flexible pressing portion 52 and the locking protrusion 60a of the locking hole 60 by means of a simple method of pressing the flexible pressing portion. In other words, opening and closing of the filter cover 35 is very easy and the filter cover is hindered from being unintentionally opened by the force of discharging air whilst the user is operating the vacuum cleaner. Therefore, the vacuum cleaner will have an improved and more efficient operation.

CLAIMS

1. An air exhaust structure for an upright-type vacuum cleaner having a cleaner body, comprising:

a frame having a duct, arranged in a side wall of the cleaner body in order to communicate with a motor driving chamber of the cleaner body;

a support member protruding from an inner wall of the duct;

a filter;

a filter cover having a grille portion disposed on the frame; and

at least one removing means for enabling opening and closing of the filter cover,

wherein the removing means includes at least one hook formed at a front end of the filter cover, and a locking hole having a locking protrusion disposed on the frame and arranged at a position corresponding to the position of the hook thereby to engage the at least one hook and to maintain the filter cover in a closed state.

2. An air exhaust structure according to claim 1, wherein the hook, or at least one of said hooks, includes:

a fixing portion extending from the filter cover;

a flexible pressing portion bent backwards in a direction approximately 180° from the fixing portion: and

a pair of protrusions disposed at respective sides of the flexible pressing portion for engagement with the locking protrusion of the locking hole.

3. An air exhaust structure according to claim 1 or claim 2, wherein at least two of the said hooks are

disposed at the front end of the filter cover.

4. An air exhaust structure according to claim 2, wherein a cutaway portion is formed in the fixing portion and a bent portion of the flexible pressing portion in order to increase the elasticity or flexibility of the flexible pressing portion.

5. An air exhaust structure according to any preceding claim, wherein one side of the filter cover is pivotably attached to the frame by a hinge.

6. An air exhaust structure for connection to an upright type vacuum cleaner. comprising:

a frame, connectable to a wall of the vacuum cleaner, and defining an internal duct through which air can be discharged from the vacuum cleaner;

a frame cover for covering the duct and having one or more apertures formed therein, the frame cover being hinged to the frame at a first edge so as to be pivotable between an open position and a duct covering position, and

a securing mechanism operable to retain the frame cover in the covering position by means of a resilient member biased so as to engage a catch, the mechanism being operable to release the resilient member from the catch by means of an external release member arranged to effect movement of the resilient member against its biasing.

7. An air exhaust structure according to claims 6, wherein the resilient member is formed on the frame cover, and the catch is formed on the frame.

8. An air exhaust structure according to claim 7, wherein the resilient member comprises a generally U-shaped hook member having (i) a fixed portion connected to the frame cover, and, (ii) a flexible portion substantially inverted from the fixed portion. the flexible portion having at least one protrusion formed thereon for engaging the frame catch.

9. An air exhaust structure according to any of claims 6 to 8, wherein tow or more securing mechanisms are provided.

10. A vacuum cleaner comprising an air exhaust structure according to any of claims 6 to 9.

11. An upright-type vacuum cleaner having a cleaner body with a side exhaust port for exhausting air from a fan chamber inside the cleaner body, the exhaust port being

defined by a perimeter wall which encircles an exhaust passage and including a hinged external grille covering the passage and a filter element associated with the grille. wherein the grille is retained in its closed position in which it covers the passage by a releasable catch assembly comprising a folded leaf spring having a root portion, a fold portion, and a fastening portion connected to the root portion by the fold portion and which is generally coextensive with the root portion, the root portion being joined to the grille or to the cleaner body in the region of the perimeter wall and extending from the joint inwardly with respect to the cleaner body, and the fastening portion having a distal release tab exposed on the exterior of the cleaner body when the grille is in its closed position.

12. An air exhaust structure, constructed and arranged substantially as herein shown and described with reference to Figures 4 to 6 of the accompanying drawings.

INVESTOR IN PEOPLE

Application No: GB 0302296.9
Claims searched: 1-5

Examiner: Rhodri Evans
Date of search: 20 May 2003

Patents Act 1977 : Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance	
X	1,5	GB 2358126 A	(Samsung) figure 5 and line 18 page 4 to line 21 page 5.
X	1,5	US 5946771 A	(Bosyj) figure 9 and lines 41-57 column 5.

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC[V]:

A4F; E2A

Worldwide search of patent documents classified in the following areas of the IPC[7]:

A47L

The following online and other databases have been used in the preparation of this search report :

WPI, EPODOC, PAJ